

CURRICULUM

FOR THE TRADE OF

TURNER (Dual Mode)

UNDER

DUAL TRAINING SYSTEM

BY



GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP
DIRECTORATE GENERAL OF TRAINING

PROPOSED TIME DISTRIBUTION FOR TURNER TRADE UNDER
INDUSTRY INSTITUTE - TRAINING SCHEME

BLOCK WITH DURATION	THEORY	PRAC.	WSC/ CAL	ENGG. DRG.	EMP. SKILL	ECA, LIB. & OTHERS	REM.
BLOCK – I (12 months/52 Weeks duration) Institute level trg.	510 hrs.	830 hrs.	170 hrs.	250 hrs.	110 hrs.	50 hrs.	160 hrs. Revision & Test
BLOCK – II (09 months /39 weeks duration) Industry level trg.	---	1560 HRS.	---	---	---	---	---
BLOCK – III (3 months/ 13 Weeks duration) Institute level trg.	100 hrs.	210 hrs. (Practical practice and submission of report related to industry training)	50 hrs.	60 hrs.	---	20 hrs.	Last 2 weeks revision & exam.
GRAND TOTAL	610 HRS.	2600 HRS.	220 HRS.	310 HRS.	110 HRS.	70 HRS.	240 HRS.
Total duration of training inclusive of Industry & Institute is 2 years (4160 HRS.)							

GENERAL INFORMATION FOR INSTITUTE (ITI)

1. **Name of the Trade** : **TURNER (Dual mode)**
2. **N.C.O. Code No.** : **8211.15**
3. **Duration of Craftsmen Training:** Two years (Three Blocks).
4. **Power norms** : 18.5 KW
5. **Space norms** : 110 Sq.mt.
6. **Entry Qualification** : Passed 10th Class with Science and Mathematics under
10+2 system of Education or its equivalent
7. **Trainees per unit** : 12 (Max. supernumeraries seats: 4)
- 8a. **Qualification for Instructors** : Degree in Mechanical Engineering from recognized university with one year post qualification experience in the relevant field
OR
Diploma in Mechanical Engineering from recognized Board of Technical Education with two years post qualification experience in the relevant field
OR
NTC/NAC in the Trade of “Turner” with 3 years post qualification experience in the relevant field.
- 8b. **Desirable qualification** : Preference will be given to a candidate with Craft Instructor Certificate (CIC) in **Turner Trade**.

Note:

- (i) Out of two Instructors required for the unit of 2(1+1), one must have Degree/Diploma and other must have NTC/NAC qualifications.
- (ii) Instructor qualification for WCS and E.D, as per the training manual.

Distribution of training on Hourly basis:

Total hours /week	Trade practical	Trade theory	Work shop Cal. &Sc.	Engg. Drawing	Employability skills	Extra curricular activity
40 Hours	25 Hours	6 Hours	2 Hours	3 Hours	2 Hours	2 Hours

SYLLABUS CONTENT WITH TIME STRUCTURE FOR TURNER TRADE

Block – I

Duration- 12 Months (52 weeks)

Institute Level Training: -

Sl. No.	Practical Duration:- 830 hrs.	Theory Duration:- 510 hrs.
1.	<p>Importance of trade training, List of tools & Machinery used in the trade. Health & Safety: Introduction to safety equipments and their uses. Introduction of first aid, operation of Electrical mains.</p> <p>Occupational Safety & Health Importance of housekeeping & good shop floor practices. Health, Safety and Environment guidelines, legislations & regulations as applicable. Disposal procedure of waste materials like cotton waste, metal chips/burrs etc. Basic safety introduction, Personal protective Equipments(PPE):- Basic injury prevention, Basic first aid, Hazard identification and avoidance, safety signs for Danger, Warning, caution & personal safety message. Preventive measures for electrical accidents & steps to be taken in such accidents. Use of Fire extinguishers.</p>	<p>Importance of safety and general precautions observed in the in the industry/shop floor. All necessary guidance to be provided to the new comers to become familiar with the working of Industrial Training Institute system including stores procedures. Soft Skills: its importance and Job area after completion of training. Introduction of First aid. Operation of electrical mains. Introduction of PPEs. Introduction to 5S concept & its application. Response to emergencies eg; power failure, fire, and system failure.</p>
2.	<p>Identification of tools & equipments as per desired specifications for marking & sawing (Hand tools , Fitting tools & Measuring tools) Selection of material as per application Visual inspection of raw material for rusting, scaling, corrosion etc., Marking out lines, gripping suitably in vice jaws, hack sawing to given dimensions, sawing different types of metals of different sections. Practice on hammering, marking out, chipping, chisel grinding</p>	<p>Measurement, line standard and end standard, steel rule-different types, graduation and limitation. Transfer caliper-its construction and uses. Hammer and chisel-materials, types and uses. Prick punch and scribe.</p> <p>Vice – types and uses, Files-different types of uses, cut, grade, shape, materials etc. Try square-different types, parts, material used etc. Calipers-types and uses (firm joint).</p>
3.	<p>Filing practice on plain surfaces, right angle by filing. Use of calipers and scale measurement. Marking & hack sawing.</p>	<p>Vee – block, scribing block, straight edge and its uses. Hacksaw-their types & uses.</p>
4.	<p>Marking operation on flat & round job. Drilling</p>	<p>Center punch- materials, construction &</p>

	operation. Threading with the help of taps and dies.	material uses. Drill machine-different parts. Hacksaw blades- sizes , different Parts. Hacksaw blades-sizes, different pitch for different materials.
5.	Demonstration of lathe , its main parts and their functions, lever positions and various lubrication points as well.	Surface plate its necessity and use. Angle plate - its use. Tap, - different types (Taper 2 nd and bottoming) care while tapping. Dies different types and uses. Calculation involved to find Out drill size (Metric and Inch).
6.	Mounting of chuck on machine spindle and unloading in various system – faceplate, 3-jaw chuck, 4-jaw chuck.	Classification of lathe - Function of different parts of Lathe.
7.	Turning of round stock on 4-jaw independent chuck. Use of 3-jaw self centering chuck as well.	Types of lathe drivers- its use. Description in details-head stock- cone pulley type- all geared type & function. Tumbler gear set. Reducing speed-necessary & uses. Back Gear Unit –its construction use.
8.	Grinding of R.H. and L.H., side cutting tools, checking of angles with tools angle gauge / bevel protractor.	Lathe cutting tool-different types, shapes and different angles (clearances and rake), specification of lathe tools
9.	Facing operation to correct length, center drilling operation,. Grinding of “V” tools for threading of Metric 60 degree threads with gauge.	Combination drill- appropriate selection of size from chart of combination drill. Drill, chuck- its uses.
10.	Parallel turning, step turning, practice - measurement with scale and outside caliper to 0.5 mm. accuracy. Measurement with vernier caliper ± 0.5 mm accuracy.	Vernier caliper-its parts, principle, graduation and reading, least count etc. Digital vernier caliper. Cutting speed, feed depth of cut, calculation involved-speed feed R.P.M. etc. recommended for different materials.
11.	Step turning practice within ± 0.5 mm, shoulder, U/cut on OD. Drilling on Lathe-step drilling, drill grinding practice.	Different types of micrometer, Outside and Inside micrometer. Vernier scale graduation and reading. Sources of error with micrometer & how to avoid them. Use of digital measuring instruments. Handling and care. Lathe accessories, chuck independent, self centering, collet, magnetic etc., its function, construction and uses.
12.	Boring practice-Plain & step, internal recessing. Reaming in lathe using solid and adjustable	Nomenclature of drill. Drills-different parts, types, size etc., different cutting angles,

	reamer.	cutting speed for different material. Boring tool. Counter -sinking and Counter boring. core drill etc. Reamers-types and uses. Lubricant and coolant-types, necessity, system of distribution, selection of coolant for different material.
13.	Checking alignment of lathe centers. Mounting job in between centers	Driving plate. Face plate & fixed & traveling steadies- construction and use. Lathe centers-types and their uses. Lathe carrier-function, types & uses.
14.	Turning practice-between centers on mandrel (Gear blanks). Fitting of dissimilar materials- M.S. in brass, aluminium, in cast iron etc. Knurling practice in lathe (Diamond, straight, helical & square).	Knurling meaning, necessity, types, grade, cutting speed for knurling. Lathe mandrel-different types and their uses. Concept of interchangeability, Limit, Fit and tolerance as per BIS: 919-unilateral and bilateral system of limit, Fits- different types, symbols for holes and shafts. Hole basis & shaft basis etc. Representation of Tolerance in drawing.
15.	Ttaper turning by compound slide swiveling. Use of sine bar and slip gauge for checking.	Taper – different methods of expressing tapers, different standard tapers. Method of taper turning, important dimensions of taper. Taper turning by swiveling compound slide, its calculation. Vernier bevel protractor-its function & reading.
16.	Male and female taper turning by taper turning attachment / compound slide practice. Blue matching.	Vernier height gauge, function, description & uses, templates-its function. Screw thread-definition, purpose & its different elements. Fundamentals of thread cutting on lathe. Combination set-square head. Center head, protractor head-its function construction and uses.
17.	Screw thread cutting (B.S.W) external R/H & L/H, checking of thread by using screw thread gauge, Fitting of male and female parts.	Different types of screw thread- their forms and elements. Application of each type of thread. Different methods of forming threads. Calculation involved in finding core dia.
18.	Fitting of male and female thread components (Metric)	Calculations involving driver-driven, lead screw pitch and thread to be cut. Tread chasing dial function, construction and use.
19.	Tool grinding for Square thread (External), Square threading (External) practice Tool grinding for Square thread (Internal) on pedestal grinder.	Conventional chart for different profiles, metric, B.A., Withworth, pipe etc.
20.	Form turning practice by hand. Tool grinding for different thread forms Grinding of various shape of chip breaker on tool.	
21.	Taper turning by taper turning attachment, Morse taper- different number.	Calculation involving gear ratios and gearing (Simple & compound gearing) Calculation involving tool Thickness, core dia.,

		pitch proportion, depth of cut etc. of sq. thread. Calculation involved – depth, core dia., pitch proportion etc. of Acme thread. Calculation involved depth, core dia., pitch proportion.
22.	Internal taper turning by taper turning attachment / cross slide. Taper matching exercise (application of Prussian blue, Plug gauge)	
23.	Balancing, mounting & dressing of grinding wheel (Pedestal). Adjustment of tool post.	Use of buttress thread. Buttress thread cutting (male & female).
24.	Periodical lubrication procedure on lathe, testing of accuracy of alignment. Procedure of checking accuracy of lathe. Preventive maintenance of lathe.	
25.	Boring and stepped boring (within +/- 0.05 mm)	Cutting tool material-H.C.S., HSS, Tungsten. Carbide, Ceramic etc. - Constituents and their percentage. Tool life, quality of a cutting material.
26.	Setting and turning operation involving face and angle plate	Form tools-function-types and uses, Template-purpose & use. Dial test indicator- construction & uses Calculation involving modified rake and clearance angles of lathe tool at above and below the center height. Subsequent effect of tool setting. Jig and fixture-definition, type and use. Chip breaker on tool-purpose and type
27.	Thread on taper surface (Vee form).	Sine bar-types and use. Slip gauges-types, uses and selection. Checking of taper with sin bar and roller-calculation involved
28.	Demo of parts of CNC machine – control switches, console buttons and machines specifications Demonstration of CNC lathe parts - bed, spindle motor and drive, chuck, tailstock, tool changer, axes motor and ballscrews, guideways, LM guides, console, electrical, coolant system, hydraulic system, chip conveyor. Working of parts explained using multimedia based CNC simulator.	Method of brazing solder, flux used for tip tools. Cutting speed, feed, turning time, depth of cut calculation, cutting speed chart (tungsten carbide tool) etc. Basic classification of tungsten carbide tips. Tool life, negative top rake-its application and performance with respect to positive top rake Lubricant-function, types, sources of lubricant. Method of lubrication. Dial test indicator use for parallelism and concentricity etc. in respect of lathe work Grinding wheel abrasive, grit, grade, bond etc. Preventive maintenance, its necessity, frequency of lubrication. Preventive maintenance schedule., TPM (Total Productive Maintenance), EHS (Environment, health, Safety)

		Fixed and follower Rest – construction and uses
29.	CNC part programming with simple exercises and various programming codes. Practice on CNC machine simulator.	<p>Calculation involving gear ratios metric threads cutting on inch L/S Lathe and vice-versa. Different types of attachments used in lathe. Various procedures of thread measurement thread screw pitch gauge.</p> <p>Screw thread micrometer, tool maker, microscope etc. Telescopic gauge its construction and uses. Calculation involving fractional threads. Odd & even threads. Multiple thread function, use, different between pitch & lead, formulate to find out start, pitch, lead. Gear ratio etc.</p> <p>Interchangeability meaning, procedure for adoption, quality control procedure for quality production. Importance of Technical English terms used in industry –(in simple definition only) Technical forms, process charts, activity logs in required formats of industry, estimation, cycle time, productivity reports, job cards. Related theory and calculation. Surface finish symbols used on working blueprints- I.S. system lapping, honing etc</p>
30.	CNC turning center operation in various modes : jog, single block, auto, MDI, edit, etc. Program entry. Setting of tool offsets, entry of tool nose radius and orientation. Practice on CNC machine simulator. Machining parts on CNC lathe with parallel, taper, step, radius turning, grooving and threading of different pitches. The practice is on CNC machine simulator.	<p>Indexing of start - different methods. Tool shape for multi-start thread. Setting of a lathe calculation for required change wheel Calculation involving shape of tool, change wheel, core dia etc. Helix angle, leading angle & following angles. Thread dimensions-tool shape, gear, gear calculation, pitch, depth, lead etc. Accessories used on face plate –their uses. Angle plate-its construction & use. Balancing-its necessity. Care for holding split bearing. Fixture and its use in turning. Setting of tool for taper threads-calculation of taper setting and thread depth. Heat treatment – purpose & procedure hardening, tempering, carbonizing etc.</p>

		<p>CNC technology basics: Difference between CNC and conventional lathes. Advantages and disadvantages of CNC machines over conventional machines. Schematic diagram of CNC system. Axes convention. Working of parts explained using multimedia CNC teachware. Parts shown on machine.</p> <p>Programming – sequence, formats, different codes, canned cycles. Absolute and incremental programming. Tool nose radius compensation (G41/42). Cutting tool materials, cutting tool geometry – insert types, holder types, insert cutting edge geometry, ISO nomenclature for turning tools, boring tools, inserts. Cutting parameters - cutting speed, feed rate, depth of cut, constant surface speed, limiting spindle speed. Process planning, tool selection and cutting parameters selection. Explained using multimedia CNC teachware and CNC machine simulator.</p> <p>Program execution in different modes like single block, manual and auto. Tool and work offsets setting. Prepare various programs as per drawing. Concepts taught using multimedia CNC teachware.</p> <p>Prepare various programs as per drawing. Concepts taught using multimedia CNC simulator.</p> <p>Different types of programming techniques of CNC machine.</p>
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NOTE: - Maximum uses of video demonstration and other IT based teaching aids may be adopted to deliver the theoretical knowledge.

Syllabus for

EMPLOYABILITY SKILLS

GENERAL INFORMATION
(Employability Skill)

1. **Name of the subject:** EMPLOYABILITY SKILLS
2. **Hours of Instruction:** 110 Hrs.
3. **Examination:** The examination will be held at the end of the training.
4. **Instructor Qualification:**

MBA OR BBA with two years experience OR Graduate in Sociology/ Social Welfare/ Economics with Two years experience OR Graduate/ Diploma with Two years experience and trained in Employability Skills from DGET institutes

AND

Must have studied English/ Communication Skills and Basic Computer at 12th / Diploma level and above

OR

Existing Social Studies Instructors duly trained in Employability Skills from DGET institutes

5. **Instructor:**

One full time regular instructor shall be engaged on every 240 numbers of trainees for teaching the subject “Employability Skills”. One additional full time regular instructor would be required on increase in every 240 trainees. Wherever the trainees are less than 240 or part thereof, a part-time instructor may be engaged to teach the subject.

ALLOTMENT OF TIME AND MARKS AMONG THE TOPICS

Sl. No.	Topics	Allotted Hours	Marks Allotted	To be covered in
1.	English Literacy	20 hrs.	9	Block – I
2.	I.T. Literacy	20 hrs.	9	
3.	Communication Skills	15 hrs.	7	
4.	SUB TOTAL:	55	25	
5.	Entrepreneurship Skills	15 hrs.	6	
6.	Productivity	10 hrs.	5	
7.	Occupational safety , health and Environment Education	15 hrs.	6	
8.	Labour Welfare Legislation	05 hrs.	3	
9.	Quality Tools	10 hrs.	5	
	Sub Total:	55	25	
	TOTAL	110 hrs.	50	

Detail of Syllabus

1. English Literacy	
Hours of Instruction: 20 Hrs. Marks Allotted: 09	
Pronunciation	Accentuation (mode of pronunciation) on simple words, Diction (use of word and speech)
Functional Grammar	Transformation of sentences, Voice change, Change of tense, Spellings.
Reading	Reading and understanding simple sentences about self, work and environment
Writing	Construction of simple sentences Writing simple English
Speaking / Spoken English	Speaking with preparation on self, on family, on friends/ classmates, on know, picture reading gain confidence through role-playing and discussions on current happening job description, asking about someone's job habitual actions. Cardinal (fundamental) numbers ordinal numbers. Taking messages, passing messages on and filling in message forms Greeting and introductions office hospitality, Resumes or curriculum vita essential parts, letters of application reference to previous communication.
2. I.T. Literacy	
Hours of Instruction: 20 Hrs. Marks Allotted: 09	
Basics of Computer	Introduction, Computer and its applications, Hardware and peripherals, Switching on-Starting and shutting down of computer.
Computer Operating System	Basics of Operating System, WINDOWS, The user interface of Windows OS, Create, Copy, Move and delete Files and Folders, Use of External memory like pen drive, CD, DVD etc, Use of Common applications.
Word processing and Worksheet	Basic operating of Word Processing, Creating, opening and closing Documents, use of shortcuts, Creating and Editing of Text, Formatting the Text, Insertion & creation of Tables. Printing document. Basics of Excel worksheet, understanding basic commands, creating simple worksheets, understanding sample worksheets, use of simple formulas and functions, Printing of simple excel sheets
Computer Networking and INTERNET	Basic of computer Networks (using real life examples), Definitions of Local Area Network (LAN), Wide Area Network (WAN), Internet, Concept of Internet (Network of Networks), Meaning of World Wide Web (WWW), Web Browser, Web Site, Web page and Search Engines. Accessing the Internet using Web Browser, Downloading and Printing Web Pages, Opening an email account and use of email. Social media sites and its implication. Information Security and antivirus tools, Do's and Don'ts in Information Security, Awareness of IT - ACT, types of cyber crimes.
3. Communication Skills Hour of Instruction: 15 Hrs. Marks Allotted: 07	
Topic	Contents
Introduction to Communication Skills	Communication and its importance
	Principles of Effective communication
	Types of communication - verbal, non verbal,

	written, email, talking on phone.
	Non verbal communication -characteristics, components- Para-language
	Body - language
	Barriers to communication and dealing with barriers.
	Handling nervousness/ discomfort.
Listening Skills	Listening-hearing and listening, effective listening, barriers to effective listening guidelines for effective listening.
	Triple- A Listening - Attitude, Attention & Adjustment.
	Active Listening Skills.
Motivational Training	Characteristics Essential to Achieving Success
	The Power of Positive Attitude
	Self awareness
	Importance of Commitment
	Ethics and Values
	Ways to Motivate Oneself
	Personal Goal setting and Employability Planning.
Facing Interviews	Manners, Etiquettes, Dress code for an interview
	Do's & Don'ts for an interview
Behavioral Skills	Problem Solving
	Confidence Building
	Attitude
4. Entrepreneurship Skills Hour of Instruction: 15 Hrs. Marks	
Allotted: 06	
Concept of Entrepreneurship	Entrepreneur - Entrepreneurship - Enterprises:-Conceptual issue Entrepreneurship vs. management, Entrepreneurial motivation. Performance & Record, Role & Function of entrepreneurs in relation to the enterprise & relation to the economy, Source of business ideas, Entrepreneurial opportunities, The process of setting up a business.
Project Preparation & Marketing analysis	Qualities of a good Entrepreneur, SWOT and Risk Analysis. Concept & application of PLC, Sales & distribution Management. Different Between Small Scale & Large Scale Business, Market Survey, Method of marketing, Publicity and advertisement, Marketing Mix.
Institutions Support	Preparation of Project. Role of Various Schemes and Institutes for self-employment i.e. DIC, SIDA, SISI, NSIC, SIDO, Idea for financing/ non financing support agencies to familiarizes with the Policies /Programmes & procedure & the available scheme.
Investment Procurement	Project formation, Feasibility, Legal formalities i.e., Shop Act, Estimation & Costing, Investment procedure - Loan procurement - Banking Processes.
5. Productivity	
Hour of Instruction: 10 Hrs. Marks Allotted: 05	

Benefits	Personal / Workman - Incentive, Production linked Bonus, Improvement in living standard. Industry Nation.
Affecting Factors	Skills, Working Aids, Automation, Environment, Motivation How improves or slows down.
Comparison with developed countries	Comparative productivity in developed countries (viz. Germany, Japan and Australia) in selected industries e.g. Manufacturing, Steel, Mining, Construction etc. Living standards of those countries, wages.
Personal Finance Management	Banking processes, Handling ATM, KYC registration, safe cash handling, Personal risk and Insurance.
7. Occupational Safety, Health and Environment Education Hour of	
Instruction: 15 Hrs. Marks Allotted: 06	
Safety & Health	Introduction to Occupational Safety and Health importance of safety and health at workplace.
Occupational Hazards	Basic Hazards, Chemical Hazards, Vibroacoustic Hazards, Mechanical Hazards, Electrical Hazards, Thermal Hazards. Occupational health, Occupational hygienic, Occupational Diseases/ Disorders & its prevention.
Accident & safety	Basic principles for protective equipment. Accident Prevention techniques - control of accidents and safety measures.
First Aid	Care of injured & Sick at the workplaces, First-Aid & Transportation of sick person
Basic Provisions	Idea of basic provision of safety, health, welfare under legislative of India.

Ecosystem	Introduction to Environment. Relationship between Society and Environment, Ecosystem and Factors causing imbalance.
Pollution	Pollution and pollutants including liquid, gaseous, solid and hazardous waste.
Energy Conservation	Conservation of Energy, re-use and recycle.
Global warming	Global warming, climate change and Ozone layer depletion.
Ground Water	Hydrological cycle, ground and surface water, Conservation and Harvesting of water
Environment	Right attitude towards environment, Maintenance of in -house environment
7. Labour Welfare Legislation Hour of Instruction: 05 Hrs.	
Marks Allotted: 03	
Welfare Acts	Benefits guaranteed under various acts- Factories Act, Apprenticeship Act, Employees State Insurance Act (ESI), Payment Wages Act, Employees Provident Fund Act, The Workmen's compensation Act.
Hour of Instruction: 10 Hrs.	
8. Quality Tools	Marks Allotted: 05
Quality Consciousness	Meaning of quality, Quality characteristic.
Quality Circles	Definition, Advantage of small group activity, objectives of quality Circle, Roles and function of Quality Circles in Organization, Operation of Quality circle. Approaches to starting Quality Circles, Steps for continuation Quality Circles.
Quality Management System	Idea of ISO 9000 and BIS systems and its importance in maintaining qualities.
House Keeping	Purpose of Housekeeping, Practice of good Housekeeping.
Quality Tools	Basic quality tools with a few examples

Tools & Equipments for Employability Skills:

Sl. No.	Name of the Equipment	Quantity
1	Computer (PC) with latest configurations and Internet connection with standard operating system and standard word processor and worksheet software	10 nos.
2	UPS - 500Va	10 nos.
3	Scanner cum Printer	1 no.
4	Computer Tables	10 nos.
5	Computer Chairs	20 nos.
6	LCD Projector	1 no.
7	White Board 1200mm x 900mm	1 no.

* Note: Above Tools & Equipments not required, if Computer LAB is available in the institute.

Syllabus for

ENGINEERING DRAWING

GENERAL INFORMATION
(Engineering Drawing)

1. **Name of the Subject :** ENGINEERING DRAWING
2. **Hours of Instruction:** 310 hrs.
3. **Instructor Qualification:** Degree in Engineering with one year experience
OR
Diploma in Engineering with two years experience
OR
NCVT / NAC in the Draughtsman (Mechanical / Civil)
with three years experience.
4. **Desirable:** Craft Instructor Certificate in RoD & A course under NCVT.
5. **Instructor:**
 - One full time instructor is required for 144Engineering seats sanctioned in the institute. Additional instructor will be required on increase in every 144 students.
 - For seats less than 144, the instructor may be out sourced/ hired on contract basis.

Details of syllabus

Sl. No.	Topics (Total duration – 310 hrs.)
1.	Engineering Drawing: Introduction and its importance <ul style="list-style-type: none"> - Relationship to other technical drawing types - Conventions - Viewing of engineering drawing sheets. - Method of Folding of printed Drawing Sheet as per BIS SP:46-2003
2.	Drawing Instruments : their Standard and uses <ul style="list-style-type: none"> - Drawing board, T-Square, Drafter (Drafting M/c), Set Squares, Protractor, Drawing Instrument Box (Compass, Dividers, Scale, Diagonal Scales etc.), Pencils of different Grades, Drawing pins / Clips.
3.	Lines : <ul style="list-style-type: none"> - Definition, types and applications in Drawing as per BIS SP:46-2003 - Classification of lines (Hidden, centre, construction, Extension, Dimension, Section) - Drawing lines of given length (Straight, curved) - Drawing of parallel lines, perpendicular line - Methods of Division of line segment
4.	Drawing of Geometrical Figures: Definition, nomenclature and practice of - Angle: Measurement and its types, method of bisecting. <ul style="list-style-type: none"> - Triangle -different types - Rectangle, Square, Rhombus, Parallelogram. - Circle and its elements.
5.	Lettering and Numbering as per BIS SP46-2003: - Single Stroke, Double Stroke, inclined, Upper case and Lower case.
6.	Dimensioning: <ul style="list-style-type: none"> - Definition, types and methods of dimensioning (functional, nonfunctional and auxiliary) - Types of arrowhead - Leader Line with text
7.	Free hand drawing of <ul style="list-style-type: none"> - Lines, polygons, ellipse, etc. - geometrical figures and blocks with dimension - Transferring measurement from the given object to the free hand sketches.
8.	Sizes and Layout of Drawing Sheets <ul style="list-style-type: none"> - Basic principle of Sheet Size - Designation of sizes - Selection of sizes - Title Block, its position and content - Borders and Frames (Orientation marks and graduations) - Grid Reference - Item Reference on Drawing Sheet (Item List)
9.	Method of presentation of Engineering Drawing <ul style="list-style-type: none"> - Pictorial View - Orthogonal View - Isometric view
10.	Symbolic Representation (as per BIS SP:46-2003) of : <ul style="list-style-type: none"> Fastener (Rivets, Bolts and Nuts) - Bars and profile sections - Weld, brazed and soldered joints. - Electrical and electronics element - Piping joints and fittings

11.	Construction of Scales and diagonal scale
12.	Practice of Lettering and Title Block
13.	Dimensioning practice: <ul style="list-style-type: none"> - Position of dimensioning (unidirectional, aligned, oblique as per BIS SP:46-2003) - Symbols preceding the value of dimension and dimensional tolerance. - Text of dimension of repeated features, equidistance elements, circumferential objects.
14.	Construction of Geometrical Drawing Figures: <ul style="list-style-type: none"> - Different Polygons and their values of included angles. Inscribed and Circumscribed polygons. - Conic Sections (Ellipse & Parabola)
15.	Drawing of Solid figures (Cube, Cuboids, Cone, Prism, Pyramid, Frustum of Cone and Pyramid.) with dimensions.
16.	Free Hand sketch of hand tools and measuring tools used in respective trades.
17.	Projections: <ul style="list-style-type: none"> - Concept of axes plane and quadrant. - Orthographic projections - Method of first angle and third angle projections (definition and difference) - Symbol of 1st angle and 3rd angle projection as per IS specification.
18.	Drawing of Orthographic projection from isometric/3D view of blocks
19.	Orthographic Drawing of simple fastener (Rivet, Bolts, Nuts & Screw)
20.	Drawing details of two simple mating blocks and assembled view.
21.	- Machined components; concept of fillet & chamfer; surface finish symbols.
22.	- Screw thread, their standard forms as per BIS, external and internal thread, conventions on the features for drawing as per BIS.
23.	- Free hand Sketches for bolts, nuts, screws and other screwed members.
24.	- Free hand Sketching of foundation bolts and types of washers.
25.	- Standard rivet forms as per BIS (Six types).
26.	- Riveted joints-Butt & Lap (Drawing one for each type).
27.	- Orthogonal views of keys of different types
28.	- Free hand Sketches for simple pipe, unions with simple pipe line drawings.
29.	- Concept of preparation of assembly drawing and detailing. Preparation of simple assemblies & their details of trade related tools/job/exercises with the dimensions from the given sample or models.
30.	-Free hand sketch of trade related components / parts (viz., single tool post for the lathe, etc.)
31.	- Study of assembled views of Vee-blocks with clamps.
32.	- Study of assembled views of shaft and pulley.
33.	- Study of assembled views of bush bearing.
34.	- Study of assembled views of a simple coupling.
35.	- Free hand Sketching of different gear wheels and nomenclature.
36.	- Free hand Details and assembly of simple bench vice.
37.	- Reading of drawing. Simple exercises related to missing lines, dimensions. How to make queries.
38.	- Simple exercises relating missing symbols. <ul style="list-style-type: none"> - Missing views
39.	- Simple exercises related to missing section.
40.	-Free hand sketching of different types of bearings and its conventional representation.
41.	- Free hand sketching of different gear wheels and nomenclature/ Simple duct (for RAC). Free hand sketch of Reciprocating compressor - open type (for RAC)

42.	- Solution of NCVT test. - Simple exercises related to trade related symbols. - Basic electrical and electronic symbols
43.	- Study of drawing & Estimation of materials.
44.	- Solution of NCVT test papers.
45.	Revision
46.	Examination

LIST OF TOOLS & EQUIPMENTS

Sl. No.	NAME OF TOOLS / EQUIPMENTS	QUANTITY
1.	Drawing Board	20
2.	Models : Solid & cut section	as required
3.	Table for trainees	20
4.	Stool for trainees	20
5.	Cupboard (big)	01
6.	White Board (size: 8ft. x 4ft.)	01
7.	Trainer's Table	01
8.	Trainer's Chair	01

Syllabus for

Workshop Calculation & Science

GENERAL INFORMATION
(Workshop Calculation & Science)

1. **Name of the subject :** WORKSHOP CALCULATION & SCIENCE
2. **Hours of Instruction:** 220 hrs.
3. **Examination:** The examination for the subject will be held at the end of training.
4. **Instructor Qualification:** Degree in Engineering with two years experience OR
Diploma in Engineering with one year experience
5. **Desirable:** Craft Instructor Certificate in RoD & A course under NCVT.
6. **Instructor:**

One full time instructor is required for 144Engineering seats sanctioned in the institute. Additional instructor will be required on increase in every 144 students.
For seats less than 144, the instructor may be out sourced/ hired on contract basis.

SYLLABUS FOR WORKSHOP CALCULATION AND SCIENCE

(Total duration – 220 hrs.)

Topic No	Workshop Calculation	Workshop Science
1.	Unit: Systems of unit- FPS, CGS, MKS/SI unit, unit of length, Mass and time, Conversion of units	Material Science : properties -Physical & Mechanical, Types -Ferrous & Non-Ferrous, difference between Ferrous and Non-Ferrous metals, introduction of Iron, Cast Iron, Wrought Iron, Steel, difference between Iron and Steel, Alloy steel, carbon steel, stainless steel, Non-Ferrous metals, Non-Ferrous Alloys.
2.	Fractions : Fractions, Decimal fraction, L.C.M., H.C.F., Multiplication and Division of Fractions and Decimals, conversion of Fraction to Decimal and vice versa. Simple problems using Scientific Calculator.	Mass .Weight and Density : Mass, Unit of Mass, Weight, difference between mass and weight, Density, unit of density, specific gravity of metals.
3.	Square Root: Square and Square Root, method of finding out square roots, Simple problem using calculator.	Speed and Velocity: Rest and motion, speed, velocity, difference between speed and velocity, acceleration, retardation, equations of motions, simple related problems.
4.	Ratio & Proportion : Simple calculation on related problems.	Work, Power and Energy: work, unit of work, power, unit of power, Horse power of engines,
5.	Percentage : Introduction, Simple calculation. Changing percentage to decimal and fraction and vice-versa.	mechanical efficiency, energy, use of energy, potential and kinetic energy, examples of potential energy and kinetic energy.
6.	Algebra : Addition, Subtraction, Multiplication, Division, Algebraic formula, Linear equations (with two variables).	Heat & Temperature: Heat and temperature, their units, difference between heat and temperature, boiling point, melting point, scale of temperature, relation between different scale of temperature, Thermometer, pyrometer, transmission of heat, conduction, convection, radiation.
7.	Mensuration : Area and perimeter of square, rectangle, parallelogram, triangle, circle, semi circle, Volume of solids - cube, cuboid, cylinder and Sphere. Surface area of solids -cube, cuboid, cylinder and Sphere.	Basic Electricity: Introduction, use of electricity, how electricity is produced, Types of current_ AC, DC, their comparison, voltage, resistance, their units. Conductor, insulator, Types of connections - series, parallel, electric power, Horse power, energy, unit of electrical energy.
8.	Trigonometry: Trigonometrical ratios, measurement of angles. Trigonometric tables	Levers and Simple Machines: levers and its types. Simple Machines, Effort and Load, Mechanical Advantage, Velocity Ratio, Efficiency of machine, Relationship between Efficiency, velocity ratio and Mechanical Advantage.
9.	- Geometrical construction & theorem: division of line segment, parallel lines, similar angles, perpendicular lines, isosceles triangle and right angled triangle.	- Forces definition. - Compressive, tensile, shear forces and simple problems. - Stress, strain, ultimate strength, factor of safety. - Basic study of stress-strain curve for MS.
10.	- Area of cut-out regular surfaces: circle and segment and sector of circle.	- Temperature measuring instruments. Specific heats of solids & liquids.
11.	- Area of irregular surfaces. - Application related to shop problems.	- Thermal Conductivity, Heat loss and heat gain.
12.	- Volume of cut-out solids: hollow cylinders, frustum of cone, block section. - Volume of simple machine blocks.	- Average Velocity, Acceleration & Retardation. - Related problems.
13.	- Material weight and cost problems related to trade.	- Circular Motion: Relation between circular motion and Linear motion, Centrifugal force,

		Centripetal force
14.	- Finding the value of unknown sides and angles of a triangle by Trigonometrical method.	
15.	- Finding height and distance by trigonometry.	
16.	- Application of trigonometry in shop problems. (viz. taper angle calculation).	
17.	Graph: - Read images, graphs, diagrams - bar chart, pie chart. - Graphs: abscissa and ordinates, graphs of straight line, related to two sets of varying quantities.	- Friction- co-efficient of friction, application and effects of friction in Workshop practice. Centre of gravity and its practical application.
18.	Simple problem on Statistics: - Frequency distribution table - Calculation of Mean value. - Examples on mass scale productions. - Cumulative frequency -Arithmetic mean	- Magnetic substances- natural and artificial magnets. - Method of magnetization. Use of magnets.
19.	Acceptance of lot by sampling method (within specified limit size) with simple examples (not more than 20 samples).	- Electrical insulating materials. - Basic concept of earthing.
20.		- Transmission of power by belt, pulleys & gear drive. - Calculation of Transmission of power by belt pulley and gear drive.
21.		- Heat treatment and advantages.
22.		Concept of pressure - units of pressure, atmospheric pressure, absolute pressure, gauge pressure -gauges used for measuring pressure
23.		Introduction to pneumatics & hydraulics systems.

BLOCK – II

DURATION: 09 MONTHS (39 weeks)

Industry level training

BROAD LEARNING TO BE COVERED IN INDUSTRY FOR TURNER TRADE:

- 1. Safety and best practices /Basic Industrial Culture (5S, KAIZEN, etc.)**
- 2. Record keeping and documentation**
- 3. Different machining operations**
- 4. Preparing components (both in conventional and CNC) as per drg.**
- 5. Routine check for different machines**

DETAILS OF PRACTICAL SKILLS TO BE COVERED DURING INDUSTRY TRAINING FOR TURNER TRADE

Duration of training: - 09 Months

Actual training will depend on the existing facilities available in the establishments.

The candidate should be competent to execute following operation/ skills after completion of the industrial training: -

1. Safety precautions & best practices related to the shop floor.
2. Produce components on turning (different operations), boring profile turning of different metals as per drawing
3. Use of Jig and fixture on lathe operation
4. Trepanning operation
5. Turning at high speed using tungsten carbide tools including throw-away tips.
6. Taper turning (Both internal & external) by different methods
7. Thread cutting (different types viz. B.S.W , Metric, Square, Acme, Buttress - external and internal - R/H & L/H) and Fitting of male & female threaded components.
8. Use of gauge and templates, sin bar and slip gauges, bore dial gauge, etc. during manufacturing of different components.
9. Using profile projector/ tool maker's microscope / CMM for checking of turned work pieces (if facilities available)
10. Daily routine check list for all conventional and CNC machines
11. Holding and truing and turning of Crankshaft – single throw or more.
12. Turning of long shaft using steady (within 0.1 mm).
13. Cutting metric threads on inch lead screw and inch threads on Metric Lead Screw.
14. Use of attachments on lathe for different operations.
15. Multi-start thread cutting B.S.W., Metric, Square, Acme form (Male & Female)

16. Cutting of helical grooves in bearing and bushes (Oil groove)
17. Turning & boring of split bearing – (using boring bar and fixture)
18. Produce different components as per drawing by setting, preparing part programme and operating CNC turn centre.
19. Manufacturing & Assembly of Screw jack/vice/Box nut by performing different lathe operation.
20. Prepare different types of documentation as per industrial need by different methods of recording information.
21. Practice of special operations on lathes - worm gear cutting, oil groove internal and external,
22. Eccentric marking and turning. Eccentric boring and Checking of eccentricity

Note:

1. In addition to the above mentioned skills/ operations industry may impart training on any other skills/ operations related to the trade.
2. All the operations/ skills indicated above related to turning may be executed both in conventional and CNC machine.
3. Utility jobs-such as actual machine parts-components, accessories etc. should be given to trainees for machining
4. Assignment should be planned so that the apprentices may spend 20% of the total time of production type of work (using gauges, templates, fixture etc.) for developing their skill and confidence about manufacturing which will help in self- employment, if found necessary in the future.

BLOCK – III

DURATION: 3 months (13 weeks)

Institute level training

For last three months candidates will be engaged in following works: -

1. Revision of theoretical components covered during Block – I.
2. Practical practice and report submission
3. Preparing candidate to face interview, preparation of bio-data, awareness about different jobs in the related field and grooming to be an entrepreneur.
4. Self study and final AITT examination

Note:-

1. The training may be conducted in Block mode i.e. few months in ITI & few in Industry.
2. The training may be conducted in flexible mode i.e. few days of a week in ITI & few days in Industry.
3. Nine months industrial training is mandatory.
4. Last three months of training in ITI is mandatory.
5. No admission of trainees without signing MOU with industry by the Institute (ITI).
6. To sign MOU with ITI, industry must ensure the training facility should be available to impart different skill sets as indicated in Block-II. At least 60% of total skill set in Block-II for Fitter and 75% of total skill set in Block-II for Turner, Machinist & TDM(Dies & Moulds) to be covered in industry.
7. If the industry ensures delivery of skill training as per Sl. 6 then 2nd MOU is not necessary.
8. However, Industry should ensure 100% skill training indicated in Block-II & necessary arrangement to be made to cover training on rest skill set (beyond the % indicated in sl.6) in collaboration with any other related industries. Extensive use of E-learning process may also be adopted.

TRADE: TURNER (Dual mode)

LIST OF TOOLS & EQUIPMENTS FOR 12 TRAINEES+1

A : TRAINEES TOOL KIT:-

Sl. No.	Description	For Trainees
1.	Caliper out side spring joint 150 mm	12 Nos.
2.	Caliper inside spring joint 150 mm	12Nos.
3.	Caliper odd-leg firm joint 150 mm	12 Nos.
4.	Steel Rule 150 mm	12Nos.
5.	Scriber 150mm x 3 mm	12 Nos.
6.	Hammer ball peen 250 gm with handle	12 Nos.
7.	Centre punch 100 mm	12Nos.
8.	Prick punch 100 mm	12 Nos.
9.	Divider spring joint 150 mm	12Nos.
10.	Safety goggles clear glass (Good quality)	12 Nos.

B: TOOLS, EQUIPMENTS AND GENERAL OUTFIT

Sl. No.	Description	For Trainees
1.	Surface plate 60 x 60 cm	1 no.
2.	Work bench 240 x 120x 90cm high	1 no.
3.	Marking table (CI) 120 x 120 cm	1 no
4.	Bench vice 125 mm jaw	6 nos.
5.	Vee-Block 75 and 125 mm with clamp	1 pair each
6.	Universal Surface gauge 250 mm arm	2 nos.
7.	Hammer ball peen 750 gm with handle	6 nos.
8.	Chisel cold flat 20 x 150 mm	6 nos.
9.	Hammer copper/brass 500 gm with handle	12 nos.

10.	Hacksaw fixed 200 mm (Pistol grip)	6 nos.
11.	File flat 300 mm rough	6 nos.
12.	File flat 250 mm 2 nd cut	6 nos.
13.	File flat 250 mm smooth	6 nos.
14.	File half round 250 mm 2 nd cut	6 nos.
15.	File round 250 mm smooth	6 nos
16.	File half round 150 mm smooth	2 Sets
17.	Knurling tool revolving head (Rough, med, fine) diamond and straight	2 Sets
18.	Combination set 300 mm (Complete Set)	6 Nos.
19.	Screw Driver 200 & 300 blade heavy duty	2 sets each
20.	Spanner double ended 6 mm to 21 mm	2 Nos
21.	Spanner adjustable 200 mm	---
22.	Pliers flat nose 150 mm side cutting	15 nos.
23.	Caliper transfer inside 150 mm	3 nos.
24.	Micrometer Outside 0 to 1" Reading 0.0001"	----
25.	Micrometer Outside 0 to 25 mm Reading 0.01 mm	2 sets
26.	Micrometer Outside 25 to 50 mm Reading 0.01 mm	2 nos.
27.	Micrometer Outside 50to 75 mm Reading 0.01 mm	2 sets
28.	Micrometer Inside up to 25 mm Reading 0.01 mm	2 nos.
29.	Micrometer Inside up to 50 to 150 mm reading 0.01 mm	2 nos.
30.	Depth Gauge Micrometer 0 to 150 mm Reading 0.01 mm	2 nos.
31.	Vernier Caliper Outside, Inside and Depth 200 mm /8 inches with metric & inch scale	6 nos.
32.	Dial Vernier Caliper with metric 200 mm reading 0.05 mm	6 nos.
33.	Vernier Bevel Protractor 300 mm blade	6 nos.
34.	Vernier Micrometer 0 - 25 mm o/s LC 0.001mm	2 nos.
35.	Vernier Micrometer 25 - 50 mm outside reading 0.001mm	2 sets
36.	Vernier Micrometer 0 inch to 1 inch. Outside Reading 0.0001 inch	2 nos.
37.	Feeler Gauge 100 mm blade metric set	2 sets
38.	Radius Gauge 1 to 7 mm & 7.5 to 15 mm	6 Nos

39.	Centre Gauge com. 60°, 55° and 29°	2 sets
40.	Screw Pitch Gauge Whitworth & Metric each	2 sets
41.	Drill Angle Gauge	2 sets
42.	Dial Test Indicator 0.01 mm with magnetic base	2 sets
43.	Vernier Height Gauge with dial 300 mm L.C. 0.01 mm	1 set
44.	Try Square 150 blade	4 nos.
45.	Magnifying Glass 75 mm dia.	4 nos.
46.	Plain Ring and Plug Gauge 12 to 50 mm by 1mm	1 set each
47.	Wheel Dresser Huntingon-type with star cutter	1 No.
48.	Wheel Dresser Diamond (inserted-0.75 or 1 Carat)	2 Nos.
49.	Screw Thread micrometer interchangeable	1 No
50.	Morse Taper Plug & Ring Gauge no. 0 to 7 MT	1 set
51.	Sin Bar with centers 200 mm	2 Nos.
52.	Slip Gauge metric set (87 pieces in a Box)	2 Nos.
53.	Morse Taper Sleeves No. 0-1, 1-2, 2-3, 3-4, 4-5.	1 set
54.	Drill Drift	1 Set.
55.	Twist Drill straight shank 1 to 12 mm by 1 mm	1 No.
56.	Twist Drill taper shank 10-12 mm by 0.5 mm	1 set (Box)
57.	Drill Chuck 12 mm cap with key	2 Sets.
58.	Tap & Die B.A. No. 0 to 10 in a box	2 Nos...
59.	Tap & Die metric set up to 25 mm	2 Sets
60.	Tap & Die B.S.F. up to 1 inch	2 Sets.
61.	Tap & Die B.S.W. up to 1 inch	2 Sets.
62.	Reamer machine straight flute 6 to 25 mm	1 Set.
63.	Reamer Adjustable 10 to 20 mm	1 set.
64.	Tool Holder RH & straight for mm square tool bit	1 No.
65.	Parting Tool Holder with H.S.S. blade	12 Nos.
66.	Tool Bits 12 X 150 mm sq. assorted shaped	15 Nos.
67.	Boring Tool holder for 6 mm sq. tool bit	15 Nos.
68.	Steel Rule 300 mm with Metric and Inch	15 Nos.

69.	Oil Can ½ pint (pressure feed system)	06 Nos.
70.	Dog Carrier 235, 50 and 75 mm	12 Nos
71.	Angle Plate with slots 200 mm	04 Nos.
72.	Spirit Level 0.05 meter 200 m	2 Nos.
73.	Tool Maker's button	1 set
74.	Combination Drill A-2.5 and A-1	1 set
75.	Oil Stone 12 mm sq. x 100 long fine	12 nos.
76.	Tap Wrench (adjustable)	09 Nos.
77.	Die Handle	2 Nos.
78.	Tool Bit assorted sizes on holder	2 Nos.
79.	Machine Vice 100 mm jaw (For Drill Machine)	03 Nos.
80.	Chalk Board on mobile stand	1 No.
81.	Spare Grinding Wheel Ajax type for carbide tool	1 No.
82.	Almirah-1980x 910 x 480 mm	2 No.
83.	St. Locker with drawer (Pigeon holes)	.1 No.
84.	Desk	1 No.
85.	Stool	4 Nos.
86.	Angle Gauge for tool grinding	6 Nos
87.	Revolving Centrer (to suit Lathe tailstock)	6 Nos
88.	Tool Cemented carbide assorted shaped (External) for steel turning –set of 12 nos.	1 No.
89.	Thread Plug Gauge M-20 & M-21	1 set
90.	Thread Ring Gauge M-20 & M-21	1 No.
91.	Gauge Drill Grinding	1 No
92.	Magnetic Chuck 150 mm dia.(Circular type)	1 set.
93.	Lathe Mandrels (Diff. Types)	1 No.
94.	Combination Drill	4 Nos. each.
95.	Fire Extinguisher and buckets	02 nos. each.
96.	Bore dial gauge stems – 12 to 35 mm, 35 to 65 mm., dial gauge indicator of 0.01 accuracy.	1 set each

C : MACHINERIES AND EQUIPMENTS

Sl. No.	Machinery and Equipment	Quantity	Remarks
1	2	3	4
1.	Lathe S.S. & S.C. (All geared head stock) with minimum specification as: 150 mm center height, to admit 750 mm between centers. Machine to be motorized and supplied with coolant installation, 4-jaw Independent chuck 150 mm, 3-jaw self-centering chuck 150 mm, fixed steady, traveling steady, face plate, driving plate, 4-way tool post, quick change gear box for Metric or British threads, live and dead centers with taper attachments.	5 nos.	
2.	Lathe S.S & S.C.(all geared type) with minimum specification as: 150 mm. Center height, 1000 mm between centers, gap bed machine to be motorized and supplied with coolant installation, 4-jaw independent chuck 250 mm , 3-jaw self-centering chuck 200 mm fixed steady, face plate, driving plate, 4-way tool post, quick change gear box for Metric/British threads, live and dead centers with taper attachments.	1 no.	
3.	Lathe tool room S.S. & S.C. (all geared type) with minimum specification as: 150 mm center height, 1000 mm between centers. Machine to be motorized and supplied with coolant installation, 4-jaw independent chuck 250 mm, 3-jaw self-centering chuck 150 mm fixed steady, traveling steady, face plate, driving plate, 1-way tool post, draw in type collets set up to 25 mm, 0.5 mm, relieving attachments.	1 nos.	
4.	Grinding machine pedestal type D.E. 150 mm dia. Wheel with wheel guard and vision.	1 no.	
5.	Drill machine pillar type-motorized up to 12 mm. Cap.	1 no.	
6.	Power saw machine – hydraulic feed system – 400 mm. Blade size.	1 no.	

D: List of additional machines, tools & equipment for two units:

Sl. No.	Description	Quantity
1.	a) Multimedia based simulator for CNC technology and interactive CNC part programming software for turning with virtual machine operation and simulation using popular operation control system such as Fanuc, Siemens, etc. (Web-based or licensed based) (10 trainees + 1 faculty)	a) 11 users

	b) Desktop Computers compatible to run above simulation software with LAN facility	b) 11 nos.
2. @	LCD projector / large screen TV	1 no.
3. @	Digimatic Electronic Vernier Caliper inch and mm 8"/200 mm. LCM 0.005"/0.001 mm	2 nos.
4. @	Digimatic electronic outside Micrometer (0 to 25 mm & 25 to 50 mm) LC 0.001 mm.	1 no. each

NOTE: -

1. No additional items are required to be provided to the batch working in the second and third shift except the items under trainee's Tool kit.
2. Items marked @ are not required to be provided for any additional batches.
3. Institute having computer lab may use the existing infrastructure to impart simulation training & in that case not required to procure item no. 1b.
4. The specification of the items in the above list has been given in metric units. The items, which are available in the market nearest to specification as mentioned above, should procure.

ALLOTMENT OF TIME & MARKS AMONG

THE SUBJECTS FOR EXAMINATION

Sl. No.	SUBJECTS	Duration of exam (in Hrs.)	Full Marks	Pass Marks
1.	Trade Theory + E/S (150+50)	3	200	80
2.	Workshop Cal. & Sc.	3	50	20
3.	Engineering Drawing	4	50	20
4.	Internal Marks (ITI)	--	50	30
5.	Trade Practical –I*	4	50	30
6.	Internal Marks (Industry)	--	50	30
7.	Trade Practical-II** + Project work (200+50)	8	250	150
GRAND TOTAL			700	360

Note:-

- a. “*” represents practical conducted at ITI
- b. “**” represents practical conducted at Industry at the end of training
- c. 40% pass marks for theory subjects and 60% pass marks for practical
- d. The project work will be conducted at industry and industry will allot marks for the same.

Format for Internal Assessment

Name & Address of the Assessor :						Year of Enrollment :								
Name & Address of ITI (Govt./Pvt.) :						Date of Assessment :								
Name & Address of the Industry :						Assessment location: Industry / ITI								
Trade Name :			Block:			Duration of the Trade/course:								
Operation/Skill:														
Sl. No	Maximum Marks (Total 100 Marks)		15	5	10	5	10	10	5	10	15	15	Total internal assessment Marks	Result (Y/N)
	Candidate Name	Father's/Mother's Name	Safety consciousness	Workplace hygiene	Attendance/ Punctuality	Ability to follow Manuals/ Written instructions	Application of Knowledge	Skills to handle tools & equipment	Economical use of materials	Speed in doing work	Quality in workmanship	VIVA		
1														
2														

LIST OF TRADE COMMITTEE MEMBERS

Sl. No.	Name & Designation	Organization
1.	Smt Sandhya Salwan, Director of Training	DGT, MSDE
2.	Shri.A.Mahendiran, Director	FTI Bangalore
3.	Shri.Satya Shankar.BP, Director	APEX-Hi-Tech, Bangalore
4.	Shri N.K Thakur, DGM	L&T Chennai.
5.	Shri Rajeev Khurana, GM	Maruti Suzuki India Ltd Gurgoan.
6.	Shri. Nirmalya Nath, ADT	CSTARI Kolkata.
7.	Shri P. MOULI, ADT	DGT Delhi.
8.	Shri R N Manna, TO	CSTARI Kolkata.
9.	Shri Anil. V. Bhide, Manager	NTTF, Bangalore
10.	Shri Kashinath. P, Director (Training), Bangalore	ACE Designers,
11.	Shri Shankara H. S.	BFW, Bangalore
12.	Shri C. Sekharan, Retd. AGM	HMT, Bangalore
13.	Shri Hemant D. Ganjare, DDT	APEX-Hi-Tech, Bangalore